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Investigating the Impact of alternative LHC optics on accelerator backgrounds at FASER using BDSIM

Sunday 1 June 2025 14:00 (2 hours)

Alternative configurations around the ATLAS experiment are investigated aiming to reduce muon rates at forward physics experiments such as FASER and SND@LHC. The Geant4 toolkit BDSIM is used to propagate muons through a model of a section of the LHC and the TI12 tunnel, where the FASER experiment is located. We compare the muon rates in BDSIM with FASER data collected during dedicated tests in the LHC. Results show a significant worsening of the background with the non-nominal polarity configuration of the triplet quadrupoles, used in 2024. The horizontal crossing angle further increased the background, however a partial mitigation of approximately 10% was found using a set of orbit corrector magnets. Additionally, nominal triplet polarity was favorable for both vertical and horizontal crossing angles. This work served as benchmark of simulations that will be used to validate future configurations.

Footnotes

Paper preparation format

LaTeX

Region represented

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Author: KEYKEN, Alex (Royal Holloway University of London)

Co-authors: LINDSTROM, Bjorn (European Organization for Nuclear Research); GIBSON, Stephen (Royal Holloway University of London)

Presenter: KEYKEN, Alex (Royal Holloway University of London)

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